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Contact: Ann Godkin, ann.godkin@ontario.ca

Ministry of Agriculture, Food and Rural Affairs

Ministère de l'Agriculture, de l'Alimentation et des Affaires rurales

Ontario

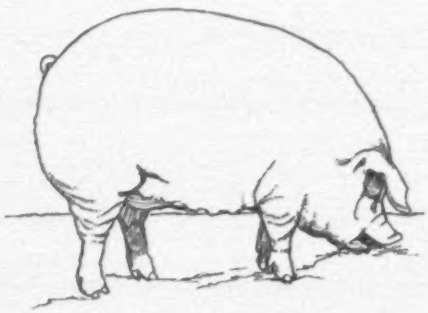
Porcine Epidemic Diarrhea: The value of repeat testing

Cristiane Mesquita, Surveillance Analyst, Veterinary Science and Policy, OMAFRA, Elora, ON; Kaushalya Kuruppu, Ontario Veterinary College 2017 and Suzanne Burlatschenko, Goshen Ridge Veterinary Services, Tillsonburg, ON

Porcine Epidemic Diarrhea (PED) is in decline in Ontario. Over half of the herds infected with PED have eliminated the virus by creating herd immunity and preventing re-infection through enhanced biosecurity protocols, cleaning and disinfection.

Herds that are unsuccessful at eliminating PED experience a chronic form of the disease, where clinical signs sporadically reappear in suckling and weaned pigs. Monitoring these farms using PCR testing is used to identify locations where virus is persisting. Funding to Ontario Pork from the Ontario Ministry of Agriculture, Food and Rural Affairs offsets the cost of laboratory fees for herds working to eliminate PED. This enhanced monitoring for PED has occasionally resulted in some unexpected findings.

For example, Farm A is a single site farrow to finish operation that continued to experience chronic PED symptoms 10 months after the initial infection. The entire sow herd was re-exposed to virus prior to a second attempt at virus elimination. Weekly sampling was performed in all production areas following the second virus exposure. Four weeks post-exposure, the farm began to wean PCR-negative pigs. These pigs were placed in clean and disinfected nursery rooms. Weekly monitoring indicated these pigs remained PCR-negative. Throughout the monitoring period, the finishing area, which consisted of 12 separate rooms, consistently tested PCR-positive in half or more of the rooms. The results for three weeks of testing in the finishing rooms are shown in Table 1. The large decline in positive test results between May 22 and June 2 was unexpected. Retesting on June 9 was consistent with a significant decline in PCR-positive findings. The owners reported no difference in clinical signs between the test-positive and test-negative weeks.



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Editor: Ann Godkin
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OMAFRA, 1 Stone Road West, Guelph, ON N1G 4Y2
Food Safety and Environment Division

Assistant Deputy Minister — Debra Sikora		(519) 826-4301

Animal Health and Welfare/
Office of the Chief Veterinarian for Ontario

Director (A)	Kelly McAslan	(519) 826-3577
Chief Veterinarian for Ontario (A)	Paul Innes	(519) 826-3127

Veterinary Science and Policy Unit, OMAFRA
1 Stone Road West, Guelph, ON N1G 4Y2

Manager	Paul Innes	(519) 826-3127
Animal Health and Welfare	Maureen Anderson	(519) 826-3571
Animal Health and Welfare	Alison Moore	(519) 826-4514
Animal Health Coordinator	Jennifer Van Gerwen	(519) 826-5128
Epidemiology	Tim Pasma	(519) 826-4656
Preparedness and Planning	Cathy Furness	(519) 826-4178
Regulatory Response	Janet Alsop	(519) 826-4323

6484 Wellington Road 7, Unit 10, Elora, ON N0B 1S0

Dairy & Beef Cattle	Ann Godkin	(519) 846-3409
Small Ruminants & Beef	Jocelyn Jansen	(519) 846-3414
Surveillance Analyst (A)	Cristiane Mesquita	(519) 846-3418
Swine	Tim Blackwell	(519) 846-3413

OVC, University of Guelph, Guelph, ON N1G 2W1

Poultry	Csaba Varga	(519) 824-4120 ext. 54650

Veterinary Services Unit, OMAF and MRA
1 Stone Road West, Guelph, ON N1G 4Y2

Manager — Greg Worley		(519) 826-6364

Animal Health and Welfare Programs and Issues, OMAFRA
1 Stone Road West, Guelph, ON N1G 4Y2
Manager —

Table 1. PED-PCR results from samples taken in 12 finishing rooms on Farm A over a three-week period.

	Ct value*		
Room #	22-May	02-Jun	09-Jun
1	>40.00	>40.00	>40.00
2	>40.00	>40.00	>40.00
3	>40.00	>40.00	>40.00
4	**32.67**	>40.00	>40.00
5	**35.38**	>40.00	>40.00
6	**35.41**	>40.00	>40.00
7	**26.93**	>40.00	**26.75**
8	**33.03**	>40.00	>40.00
9	>40.00	>40.00	>40.00
10	>40.00	>40.00	>40.00
11	37.09	>40.00	>40.00
12	>40.00	>40.00	>40.00

*A Ct value < 37 is a positive test, 37-39.99 is suspicious, and >40 is not detected.

PCR test results for PED from one week to the next varied more than expected on this farm. This case shows that it may be difficult to predict virus survival in a production area based on a single set of samples. Had only the samples been taken on May 22 five rooms would have been assessed as positive, yet they had discordant results on subsequent testing.

Serial testing provides a more representative sample of the PED status in a herd. PED testing in all herds attempting PED eradication continues to be paid for by OMAFRA through a grant to Ontario Pork that expires at the end of 2015. Veterinarians and producers interested in working towards eradication should take advantage of this testing subsidy and warm summer temperatures to advance their PED eradication efforts.

Ensuring dairy cattle are fit for transport What can veterinarian practitioners do?

From Group 5 – Attendees at the Dairy Health Management Certificate Program Conference May 2015 (Warren Skippon, Brian Keith, Nancy Charlton, Scott Robertson, Kurtis Swirsky, Charlotte Friendship, Scott Westlake, Lisa McCrae and Mark Ross)

Veterinary practitioners play a vital role in helping ensure that dairy animals that are marketed as cull dairy cows or bob calves are fit for transport. A key component is education of all those involved in marketing of cattle – producers, cattle truckers/dealers/drovers, auction market owners/employees etc. It is important they recognize that cull dairy cows spend an average 7 to 9 days in transit before they arrive at a slaughter plant.

OMAFRA inspectors report ongoing issues with animals arriving at auction markets that are not fit for transport, with 40 – 70 incidents per month where animals are sent back to farm of origin or are euthanized.

The following are some important elements of establishing a 'Fit for Transport' plan for your dairy clients:

- Develop an SOP to help producers determine if an animal is fit to be marketed, with clear guidance on what is a 'compromised animal' (e.g. cow with LDA) and what is 'unfit for transport' (e.g. cow with severe lameness).
- Laminate the decision tree "Should This Animal Be Loaded" and give to producers to have for quick reference.
- Help facilitate the 'direct to slaughter' option at the auction market (animal goes **directly** from auction to slaughter facility):
  I. Producer is educated about the option of animals going directly to slaughter from the auction market.
  II. Cattle truckers & drovers are educated and committed to helping ensure animals are marketed direct to slaughter.

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III. Veterinary calls auction market/veterinary inspector to make sure all involved are aware of the case.

- Help raise awareness of 'local slaughter' option (animal is sent **from farm to local slaughter plant**, bypassing the auction market facility):
  I. Removes stress of animal being marketed through auction facility.
  II. Ensures animal is slaughtered in a reasonable time.
  III. Animals are assessed on a case-by-case basis for this option.
  IV. Develop a roster of trusted truckers that are available to provide service.

- Consider 'on-farm slaughter' option:
  I. An option for some special cases (e.g. leg fracture).
  II. Requires coordination – veterinary meat inspector, slaughterhouse, etc.

- Other ways to help ensure animals are fit for transport:
  I. On-farm lameness producer workshops to improve recognition/treatment.
  II. On-farm euthanasia workshops to improve decision making/techniques.
  III. Veterinary 'fitness for transport' exam done at reduced fee
    ⇒ Brief visit to confirm animal is fit (e.g. 5 – 10 min exam).
    ⇒ Builds goodwill with producers – veterinarians viewed as part of solution.

Understanding the link between dairy cow behavior and heat stress

Ann Godkin, Veterinary Science and Policy, OMAFRA, Elora, ON

Heat stress in dairy cows, usually defined as an ambient Temperature-Humidity Index (THI) above 72, reduces milk production and increases the risk of some diseases, especially lameness. During hot periods cows stand longer to increase heat abatement by exposing greater body surface area, sensible water loss, heat radiating surface area and air movement.

To gain a better understanding of how heat affects cows, researchers outfitted 157 cows in 3 locations with both intra-vaginal devices to measure core body temperature (CBT) and data-loggers to measure body position.

Across all treatments, cows were more likely to be standing (vs lying) when their CBT was higher. Standing bouts increased to more than 60 minutes when CBT increased from below 37.75 to above 40.5°C. Cows that switched from lying to standing were found to be the warmest (highest CBT's) compared to those that continued to stand or switched from standing to lying. Cows CBTs rose as they lay (average 0.17°C) but decreased as they stood (0.22°C), supporting the link between behaviour and CBT. With regards to ambient conditions, the highest and lowest proportions of cows standing occurred when THI was between 80 and 89 or below 68, respectively. Daily patterns were also important. The longest standing and shortest lying times occurred between 12 noon and 6 pm daily.

Overall the time cows spent lying down was reduced as CBT and heat stress conditions increased. This research is the first to demonstrate a direct link between cow physiology (CBT) and behaviour. The authors also suggest that heat stress may be occurring at a THI of 68 or higher, rather than the current bench mark of 72.

Allen JD, LW Hall, RJ Collier and JF Smith. 2015. J Dairy Sci. 98: 118-127. Effect of core temperature, time of day and climate conditions, on behavioural patterns of lactating dairy cows experiencing milk to moderate heat stress.

A note on intravenous administration of potassium chloride solution as an adjunctive procedure to euthanasia of the bovine via penetrating captive bolt

Dr. Jeff Rau, Ruminant Field Services, Dept. of Population Medicine, Ontario Veterinary College, Guelph, ON

Euthanasia is derived from the Greek terms eu meaning good and thanatos meaning death. It is an important and inevitable part of bovine veterinary practice. There are a limited number of methodologies that are available to bovine veterinarians and their clients that are economical, practical, and facilitate a "good death". The American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals (2013) is a comprehensive resource detailing acceptable methods of euthanasia. Among these Guidelines, IV administration of potassium chloride (KCl) solution is identified as an effective and acceptable adjunctive method of producing death in the bovine, when administered to an animal previously rendered unconscious (typically via penetrating captive bolt).

Canadian veterinarians are required by law (The Veterinarians Act, 1989 O. Reg. 1093, Section 18) to "exercise generally accepted standards of practice and procedures in the performance of veterinary services. R.R.O. 1990, Reg. 1093, s. 18." The AVMA Guidelines for the Euthanasia of Animals have been adopted as the standards of practice and procedures for Canadian veterinarians (CVMA).

The Canadian Veterinary Medical Association (CVMA) Position Statement on Euthanasia further states: "Animals must be rendered irreversibly unconscious as rapidly as possible with the least possible pain, fear, and anxiety. The preferred methods used to achieve this are those that affect the brain first, followed quickly by cessation of cardiac and respiratory function."

Intravenous administration of a saturated solution of KCl in sufficient quantity is cardiotoxic and will produce cardiac arrest. Potassium chloride administered to conscious animals, and/or animals sedated with xylazine is inhumane and considered malpractice (see AVMA Guidelines S3.2.2.4 Unacceptable Methods). Bovine veterinarians and/or their clients must ensure animals are rendered unconscious prior to administration of KCl. For this a penetrating captive bolt is often the most practical and economical option.

In the bovine, two diagonal lines are drawn from the lateral canthus of the eye to the contralateral poll (i.e. lateral canthus of the right eye to the left poll, and vice versa). The captive bolt must be delivered perpendicular to the long axis of the skull where these lines intersect (i.e. X marks the spot). Absence of a corneal reflex is used to confirm loss of consciousness. 120 ml of a saturated solution of KCl (eg. 350g dissolved in 1L of water) can then be administered to ensure cardiac arrest and a quick, humane death.

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http://www.canadianveterinarians.net/documents/euthanasia

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Porcine Delta Corona Virus: a case study

Sue Bulatschenko, Goshen Ridge Vet Services, Tillsonburg, ON; Greg Dimmers, Ontario Veterinary College 2016 and Kaushalya Kuruppu, Ontario Veterinary College 2017

Porcine delta corona virus (PDCoV) was identified in the U.S. shortly after the discovery of the alpha corona virus, the porcine epidemic diarrhea virus (PEDV). Early reports regarding the pathogenicity of delta corona virus were not all in agreement. Some infected farms reported clinical signs similar to PEDV and others did not. Later a controlled study with gnotobiotic pigs demonstrated significant villus atrophy and diarrhea following infection with delta corona virus. The polymerase chain reaction (PCR) test at the Animal Health Laboratory (AHL) detects and distinguishes between the three corona viruses considered pathogenic for swine; PEDV, transmissible gastroenteritis virus (TGEV) and PDCoV. To date the great majority of positive tests reported by the AHL are for PEDV with the occasional identification of PDCoV. Surveillance for PEDV at some abattoirs and assembly yards has occasionally identified PDCoV. Reports of clinical disease associated with PDCoV in Ontario are less common. Nine farms have been diagnosed with clinical disease associated with PDCoV at the time of writing compared to 80 farms diagnosed with PEDV.

In early January of 2015 the owners of a 500 sow farrow to finish farm in Ontario observed severe diarrhea in the pigs in the finishing barn. This farm had been previously diagnosed with PEDV in early 2014 and was undergoing PED eradication. Within 72 hours watery diarrhea was observed in all ages of pigs on the farm including lactating and gestating sows; the owners suspected a relapse of PEDV. The herd veterinarian visited the farm and observed severe lethargy, diarrhea, and anorexia in all ages of swine. Fecal and Swiffer samples were collected and sent to the AHL. Samples included fecal samples from suckling and growing pigs as well as breeding stock. Feed samples as well as individual feed ingredients were submitted for testing to rule out a feed related cause.

Six fecal samples from suckling pigs, growing pigs, and breeding and gestating sows all tested negative for PEDV and TGEV on PCR testing at the AHL. All six samples tested positive by PCR for PDCoV with Ct values ranging between 17.93 and 25.29. Testing of the same six fecal samples by PCR at the AHL for all Brachyspira species as well as Lawsonia intracellularis were negative. Testing of feed samples for vomitoxins revealed low levels of vomitoxin in lactation (0.16 ppm) gestation (0.230 ppm) and grower feed (0.332 ppm). Zearalenone was below 0.01ppm in all 3 rations. These levels were considered insufficient to produce the severe diarrhea and anorexia observed in the animals consuming this feed, particularly as the suckling pigs were not consuming the feed. Salmonella agona was isolated on enrichment from both the lactating and gestating sow feces. This Salmonella was sensitive to all antibiotics tested with the exception of gentamycin and kanamycin.

Growing pigs of approximately 30 kg in weight appeared to be in the most severe discomfort; aspirin was added to the drinking water in an effort to relieve distress. Individual pigs showing signs of severe lethargy were treated with an injectable trimethoprim-sulfa product to prevent secondary bacterial infections and because of the identification of Salmonella in the sow feces. Wood shavings were added to areas in the finishing pens where the floors were wet with diarrhea to improve footing and provide dry areas for resting.

In the week following the initial diagnosis, twenty five affected grower pigs died. Due to the unexpectedly high mortality in the grower pigs and the severity of the clinical signs, neomycin was added to the water. This therapy was implemented partly due to uncertainty about whether PDCoV alone would produce such severe clinical signs. Mortality in suckling pigs was not elevated although diarrhea was observed in all litters on the farm. Affected litters were provided with electrolyte solutions in bowls.

Within 14 days of the onset of clinical signs, pigs in all production areas were returning to normal behavior, feces were becoming firm, and all medications were withdrawn. In an effort to identify whether the

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Salmonella isolated from sow feces was a significant contributor to the clinical signs observed, three grower pigs that had not fully recovered and continued to scour were euthanized and sections of bowel were collected and sent to the AHL for histologic assessment. The histologic diagnosis was "mild to moderate villus atrophy and fusion....usually associated with post-viral enteritis (usually corona or rota virus)."

PDCoV has been identified in combination with PEDV on some Ontario farms experiencing an outbreak of diarrhea. It has also been identified on environmental sampling at Ontario abattoirs, assembly yards and trucks. This case is unusual because the herd in question had previously been infected with PEDV and despite regular extensive testing related to the PEDV eradication efforts, PDCoV had never been identified prior to the sudden onset of severe clinical signs. Feed was considered as a potential source of the outbreak and complete feeds as well as individual feed ingredients were tested following the onset of clinical signs. Although individual complete feed samples collected from within the barn tested positive for both PEDV and PDCoV, no individual feed ingredients were found positive for any corona virus by PCR. Cleaned and disinfected livestock transport trucks to ship market weight pigs were in use and a Danish entry system was in place to reduce the introduction of infection by other means.

In this outbreak of severe anorexia, diarrhea, and lethargy, only PDCoV was consistently identified in feces from affected individuals in all production areas on the farm. Histologic examination of intestinal sections from pigs recovering slowly two weeks following the outbreak showed lesions consistent with a recovering corona virus infection. This report demonstrates an association between PDCoV and severe morbidity in all classes of animals in a naïve swine herd with increased mortality in growing pigs.

Nonylphenol isomers (NP) and Nonylphenol ethoxylate (NPE) Use in teat dips

Marlene Paibomesai, Dairy Specialist, OMAFRA, Elora, ON

Nonylphenol isomers (NP) and nonylphenol ethoxylates (NPE) are used as surfactants and are a common ingredient in detergents, emulsifiers, wetting, and dispersing agents, antistatic agents, demulsifiers and solubilisers (review, Lu & Gan, 2014). Dairy Herd Management magazine (August 14th, 2014) reported that NPE residues were found in skim milk powder destined for the production of infant formulae. Dairy producers were being encouraged to change teat dip products to use those without NPE.

China has recently set a limit on the maximum NPE residue level of <10 parts per billion (ppb) in milk being imported (Natzke, 2009). This is increasing pressure on teat dip manufacturers to reduce or eliminate use of NPE in teat dip formulas. An EU directive restricts the use and sale of NPE or NP products that contain more than 0.1% based on the environmental impact (Schroeder, 2014).

Industrial detergents and household products account for 85% of the demand for NP/NPE, representing a majority of NPE containing products in the industry (Soares, et al., 2008). NP contamination in the environment primarily comes from the partial breakdown and biodegradation of NPE used in products into NP. NP is water soluble can be detected in water, sediment, sludge, and soil (Lu & Gan, 2014). NPE and NP do not have a natural source; accumulation is due to human activity only (Health Canada, 2013).

NPE are known to be endocrine-mediating compounds having acute and chronic toxicity on aquatic biota. An endocrine-mediator is a chemical which mimics naturally occurring hormones with possible implications on animal and human health as well as having environmental impact. To date there has been no substantial evidence for adverse effects in humans, but NPEs have been found in human breast milk,

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blood and urine (EPA, 2014). Absorbed through the gastrointestinal tract and skin, further research is needed on exposure risks and animal and human health. NP has been shown to negatively impact aquatic biota. In Canada, although NPEs are assigned toxic status under the Canadian Environmental Protection Act (1999), the relatively low exposure rate has resulted in use reduction being deemed low priority (Health Canada, 2013).

In agriculture, NPEs are used in pesticides as wetting agents and are used in the dairy industry in teat and udder preparations. NPE is mainly used as an emulsifier for iodine to help it dissolve in solution. Most teat dip manufacturers are opting to reduce the use of NPE by using alternative compounds. NPE have been popular for use due to their low cost and foaming action, a marketing feature for some commercial teat dip products. NPE concentration in teat dips ranges from 2 to 10%; most teat dips use a lower concentration of 2 to 3%. Typically, udder washes which are diluted before use, are in the 7 to 10% range.

Overall, NPE or NP is being phased out worldwide with regulations on their use coming from the EU, U.S. Environmental Protection Agency (EPA), and China. There are a number of alternatives to the use of NP and NPE in teat dips with some companies leading the way in this venture. The pressures from the market have brought this reduction in NP use worldwide. It appears as though most teat dip manufacturers are working to reduce NP use.

Currently as of January 2015, 95 pre-dips, post-dips and udder wash products were listed as licensed for use in Canada by Health Canada according to the HC's Drug Database. Of these 43 (45%) have NPE's listed as an active ingredient. We are aware of no restriction of use in Canada.

Dairy farmers are advised to continue to take special care to thoroughly dry teats after preparation and before attaching milking units. Careful drying will remove teat skin contaminants such as chemical residues from prep products, antibiotics from foot treatments, bacteria and dirt and prevent them from entering the bulk tank milk at milking time.

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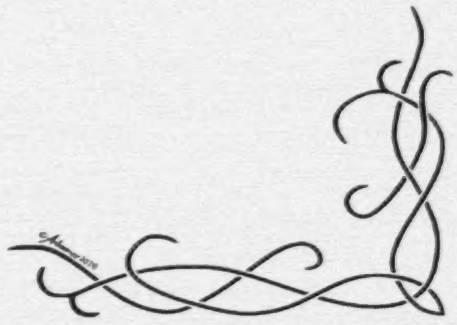

Updates from recent Johne's research

Ann Godkin, Veterinary Science and Policy Unit, OMAFRA, Elora, ON

Comparing fecal PCR to fecal culture for detection of MAP in Swiss cattle herds with a history of paratuberculosis.

Fecal cultures and PCR tests were run on 1,339 cows from 12 dairy and 11 cow-calf herds, all herds with identification of paratuberculosis in the last 5 years. Culture and PCR detected MAP in 62 (13.0%) and 9 (2.0%) of 445 fecal pools, formed by combining samples from 2 to 4 individuals within the same herd. All PCR positive pool samples were also positive on culture. The186 cow samples that made up the culture positive pools were both cultured and PCR tested; 59 were culture positive (31.7%, representing 56 pools) and 12 were PCR positive (6.5 %, representing 11 pools). In samples from 17 individual cows that developed clinical signs of Johne's at or after the initial sampling, culture detected MAP in 17 (100%) and PCR in 12 (70.6%).

Fecal culture had higher analytical sensitivity than PCR testing, as has been found in other research. Most of the difference can be attributed to the much larger volume of inoculum (and therefore greater numbers of MAP present) used for culture. Culture also detects MAP that multiplies over time on the culture media. The authors comment that fecal culture is more suitable than PCR to identify cattle with subclinical MAP infections, where low rates of bacterial shedding are likely.

Reference:

Keller SM, Stephan R, Kuenzler R, Meylan M, Wittenbrink MM. Comparison of fecal culture and F57 real-time polymerase chain reaction for the detection of Mycobacterium avium subspecies paratuberculosis in Swiss cattle herds with a history of paratuberculosis. Acta Vet Scand. 2014 Oct 10;56:68. doi: 10.1186/s13028-014-0068-9.

Rearing heifers off-site – A good thing?

A large California dairy herd reared three cohorts of heifers in different ways to evaluate the impact of rearing location on MAP infection. Cohort 1 was raised entirely on the home dairy, cohort 2 was reared on the home dairy to 5 months of age and then moved to an off-site heifer feedlot until returned home around 24 months of age and cohort 3 heifers were moved from the home dairy at one day of age to a calf nursery, then home for 2 weeks at 4 months and then to an off-site heifer feedlot until calving. Cows were tested for MAP by fecal culture and serum ELISA (HerdCheck) at the end of lactation and as part of whole herd annual tests for 3 years. Only data to the age of 6 years was included in the study.

The incidence of seroconversion to MAP was significantly lower in cohort 3 calv[illegible] (off-site) compared with cohort 1 calves (home farm raised) and cohort 2 calves (off-site at 5 months of age) (3.7% vs 8.0 and 7.3% respectively). Fecal shedding was also lower in cohort 3 compared to 1 & 2 (5.2% vs 10.3% and 10.1% respectively). Cohort 2 and 1 had similar incidence rates of seroconversion and fecal shedding.

The reduced MAP infection rate in Cohort 3 may have been due to lower exposure to MAP because the off-site locations had no adult cattle. Other management factors were also likely important.

While the study was limited to one herd, it highlights the benefits of rearing youngstock separate from older cattle to produce replacements with a much lower Johne's risk. While some MAP infection still occurred the rate was much reduced.

Reference:

Aly SS[1], Gardner IA[2], Adaska JM[3]and Anderson RJ[4]. Off-site rearing of heifers reduces the risk of Mycobacterium avium ssp. paratuberculosis ELISA seroconversion and fecal shedding in a California dairy herd.Off-site rearing of heifers reduces the risk of Mycobacterium avium ssp. paratuberculosis ELISA seroconversion and fecal shedding in a California dairy herd. J Dairy Sci. 2015 Mar;98(3):1805-14. doi: 10.3168/jds.2014-8759.

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Fine tuning ELISA testing programs for Johne's in dairy herds:

Eight herds with a prior history of Johne's and consisting of 1410 cows, were tested for MAP antibody in milk (Pourquier ELISA) on each test day for two years to detect patterns of antibody response over time. Of the 199 test-positive cows found, 87% converted from test-negative to test-positive status once, but 12.6% had at least one or more test-negative results at some time following a test-positive result. Sampling error may have been responsible for most of the discordant results as 80% were on one farm that lacked an automatic cow identification system. In positive cows the MAP antibody serum-to-positive (S/P) ratios gradually increased as cows increased in parity. The effect was most apparent in first, second and third lactations. When factors affecting the ELISA test results were examined, high milk yield was found to decrease milk ELISA test S/P ratios.

The authors recommend that a correction factor be applied to MAP ELISA scores to control for the impact of milk yield and cow parity. Practitioners should be aware that at the individual cow level an increase in milk yield may lead to an underestimation of the milk ELISA score. This effect may be particularly important when cows are in the early stages of disease and MAP antibody levels are low. More generally, to reduce the impact of dilution on MAP antibody ELISA scores, the authors suggest that the milk MAP ELISA test should be used at the beginning or end of lactation. In first lactation cows, the milk MAP ELISA tests are best run at the end of lactation for a more accurate assessment.

For incorporation into a herd MAP testing program and to support good decision making, this research suggests that milk MAP ELISA tests are best run on the first test post-calving (except for first-lactation cows) so that positive cows are maximally detected and results can be used to determine whether cows will be rebred or removed from the herd.

Reference:

Eisenberg SW[1], Veldman E[2], Rutten VP[3], Koets AP[4]. A longitudinal study of factors influencing the result of a Mycobacterium avium ssp. paratuberculosis antibody ELISA in milk of dairy cows. J Dairy Sci. 2015 Apr;98(4):2345-55. doi: 10.3168/jds.2014-8380.

Where are we headed? Update on provincial SCC trends

Ann Godkin, Veterinary Science and Policy Unit, OMAFRA, Elora, ON

Each month every dairy herd in Ontario receives an average bulk milk somatic cell count (BMSCC) based on a weighted average of bulk milk SCC tests done on each tank of milk picked up on each farm every month. Averaging all herds' counts each month gives us an overall monitor of the quality of the raw milk sold in Ontario. This may or may not give us a good indication of mastitis occurrence (as some cows will be withheld from the tank). Because it is difficult to detect each and every case of mastitis immediately, some high SCC milk enters the bulk milk, and bulk milk SCCs probably do give us a general indication of cow udder health.

In Figure 1, the monthly average BMSCCs for Ontario are shown for the years 2011 to 2015 (to April). From 2011 to 2014 the average annual counts have decreased. Each year the highest BMSCCs occurred in the warmest months (June to October). Figure 1 also shows that the largest reductions in counts appear to also occur in about the same months. At other times of the year less decrease is apparent. To date

(Continued on page 11)

this suggests that the graph of annual counts has "flattened" rather than consistently shifted downwards across all months. It's a good thing to see less high SCC milk sold in the warm months but what can we do to ensure SCC reduction happens all year round?

Figure 1, also shows that the early data for 2015 (January to April) shows that 2015 average monthly BMSCCs are slightly higher than those for 2014. Can steps be taken now to head off this trend to high SCCs before the difficult summer season is fully upon us?

Figure 2 shows that in 2014, Ontario's best BMSCC year ever with an annual BMSCC of 211, the warm months still proved a challenge to a high percentage of herds. About 25% of herds were in the higher BMSCC categories (i.e. 300 – 399, 400 – 499 and over 499) in August and September, compared to about 13% in February and March.

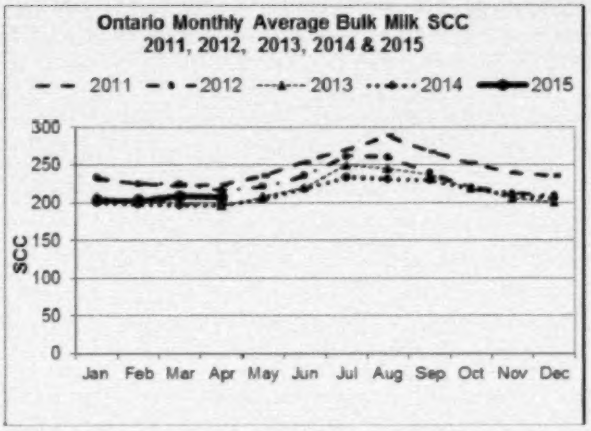


Figure 1

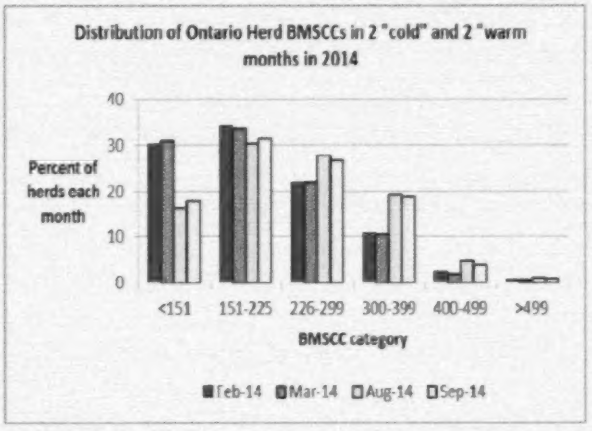


Figure 2

Summer Mastitis Project — summary of results

Cristiane Mesquita and Ann Godkin, Veterinary Science and Policy, OMAFRA, Elora, ON
Durda Slavic and Jim Fairles, Animal Health Laboratory, University of Guelph, Guelph, ON

Mastitis is an important infectious disease for the Ontario dairy industry. Mastitis prevalence and incidence increases during the summer due to conditions favourable to bacteria such as high humidity and temperature. A barrier to improvement is an inability to target programs to specific pathogens due to the lack of diagnosis of the pathogen responsible for herd infections. Acknowledging these facts, the Summer Mastitis Project (SMP) sought to assist veterinarians and dairy producers to identify herd mastitis pathogens during the summer risk period to enable them to implement herd specific measures to prevent mastitis occurrence. The project was a collaborative initiative between the Ontario Ministry of Agriculture, Food and Rural Affairs and the University of Guelph Animal Health Laboratory (AHL).

Submissions received:

Approximately 100 Ontario dairy farms submitted milk samples to the SMP from May 15 to September 30 of 2014; and 10 practices submitted samples more than once. A total of 115 submission numbers were generated during the project. Under the supervision of veterinarians, producers could submit as many samples as desired per submission but they were

(Continued on page 12)

offered a special rate to submit 10 or more samples. As a result, approximately 6% of participants submitted 1 – 9 samples, 74% submitted 10 – 15 samples, 15% submitted 16 – 30 samples and 5% submitted more than 30 samples.

Sample results:

The AHL mastitis laboratory analyzed a total of 1750 samples using culture. Bacterial identification was performed using the Matrix Associated Laser Desorption-Ionization - Time of Flight (MALDI-TOF) methodology. Samples from both clinical and subclinical mastitis cases were accepted. The results were classified into 42 different categories that included: no bacterial growth, no bacterial pathogens detected, overgrown with contaminants, overgrown with *Proteus spp.*, Gram-negative bacillus, Gram-negative coccobacillus, 34 bacterial species, mold and yeast. The most common bacteria isolated were: coagulase negative *Staphylococci*, *Corynebacterium spp.* and *Staphylococcus aureus*. A considerable number of samples (18.34%) showed no bacterial growth or no bacterial pathogens. The frequency of isolates, categories and frequency of occurrence are displayed in Table 1.

The number of isolates per sample ranged from 0 to 6, where 0 represented the samples classified as having no bacterial growth or no bacterial pathogens. Figure 1 shows the frequency distribution according to the number of isolates.

The NMC laboratory handbook on bovine mastitis classifies quarter milk samples with three or more isolates as likely contaminated. Using this definition, and isolate count alone, 9% of samples would be called contaminated and uninterpretable.

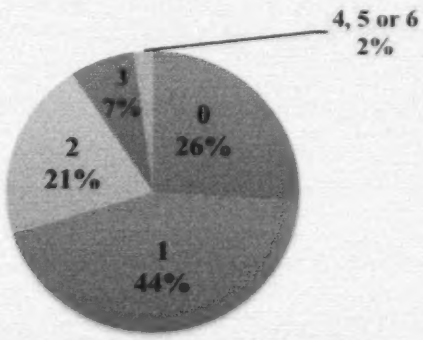
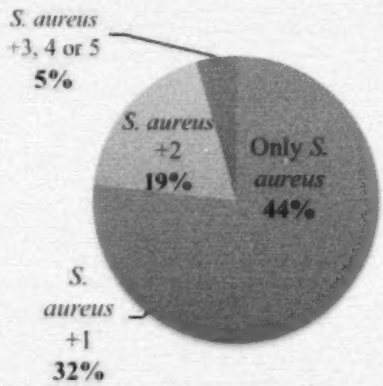


Figure 1. Number of isolats per sample (2014).

Some bacterial species such as *Staphylococcus aureus* are well known to be major bovine mastitis pathogens. While many other species may be able to cause mastitis it is very difficult to tell if the vast majority of the isolates identified by the MALDI-TOF were true mastitis pathogens. Even when known mastitis pathogens are identified, the presence of additional bacterial species makes it difficult to assume that the bacteria isolated have originated from inside the udder (mastitis) as opposed to teat skin or teat end contamination from the environment, other cows, or the sample collectors hands.

During this project *Staphylococcus aureus* was isolated from 305 samples. In 56% of samples it was accompanied by other bacteria. The most common bacteria found associated with *S. aureus* were coagulase negative Staphylococci, *Corynebacterium spp.* and *Streptococcus dysgalactiae*. The frequency distribution of *S. aureus* and other isolates are displayed on Figure 2.

Figure 2. Number of isolates with S. *aureus*.



Prototheca sp was isolated in 16 samples and, like *S. aureus* it was accompanied by other bacteria in 56% of samples. The most common bacteria found with *Prototheca* sp were coagulase negative Staphylococci and *Lactococcus spp*. Figure 3 shows the frequency distribution of *Prototheca* sp and other isolates.

(Continued on page 13)

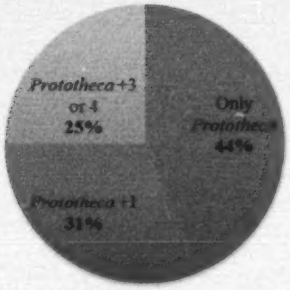


Figure 3. Number of isolates with *Prototheca* sp.

Misdiagnosis:

It is important to keep in mind that culture results may not represent intramammary infection. When samples are collected, the bacteria that caused the inflammation may or may not be there for numerous reasons. For instance, antibiotic treatment or even immune system response, may remove bacteria before they can be detected from a milk sample culture. However, the main reason for misdiagnosis is inappropriate sample collection technique. As mentioned above, quarter samples with three or more isolates are considered contaminated and do not provide any useful information. At the same time, results with no bacterial growth may sound like good news but it may not be accurate.

The most common sources of contamination for milk samples are: dirty hands, contaminated bottles or vials, contaminated lids, teat skin, teat ends or teat orifices and excess alcohol left on teats or hands. Implementing and teaching producers aseptic techniques for milk sample collection can avoid misdiagnosis and a wasting of time and money. The NMC recommend the following procedures:

- Identify tubes prior to sample collection;
- Wash your hands prior to sample collection;
- Discard several streams of milk before collecting the sample and also evaluate milk aspect and quarters for signs of clinical mastitis;
- Pre-dip teats in disinfectant and allow contact time of at least 30 seconds to elapse;
- Use individual cloth towels or paper towels to dry teats thoroughly paying special attention to teat ends;
- Starting with the furthest teat ends, scrub the teat ends with cotton balls or gauze moist with 70% alcohol until no dirt appears on the swab. Do not use the same cotton ball or gauze in more than one teat end;
- Start sample collection with the closest teats. Remove the sampling bottle or tube cap; collect one to three streams of milk and place the cap back immediately. Be careful to not overfill tubes;
- For composite samples, collect approximately 2 mL of milk from each teat, also starting with the nearest teat;
- Refrigerate samples immediately and send to the laboratory. If samples will take more than 48 hours to get to the laboratory, they should be frozen immediately.

There are other simple measures that can reduce misdiagnosis. Storing samples properly reduces bacterial multiplication, particularly of contaminants. Collecting multiple samples from the same animal will give a more reliable result than a single sample. Also, collecting quarter samples instead of composite samples may be better for individual cow mastitis diagnosis. An easy way to help decrease false negative results (no bacterial growth) is to use a CMT mastitis paddle to confirm inflammation at the quarter level and which will help to determine if a case of mastitis exists.

It is evident that teaching producers to use aseptic techniques for milk sample collection, improved hand hygiene and appropriate storage will provide a more accurate diagnosis from milk bacterial culture. Veterinarians are the linkage between the field and the laboratory. Veterinarians are essential for interpreting culture results for producers and prescribing appropriate preventive or therapeutic actions, but this must be based on appropriate sample collection.

(Continued on page 15

Table 1: Distribution and frequency of isolates among 1750 samples

Isolates	Number of Samples
Acinetobacter spp.	72
Aerococcus spp.	95
Aeromonas spp.	8
Arthrobacter spp.	2
Citrobacter spp.	7
Coagulase Neg. Staphylococci including: *S. chromogenes* *S. epidermidis* *S. simulans* *S. hyicus*	520 163 51 20 6
Corynebacterium spp.	204
Enterobacter spp.	22
Enterococcus spp.	73
Escherichia coli	74
Gram-negative bacillus	3
Gram-negative coccobacillus	2
Hafnia spp.	1
Klebsiella spp. including: *K. pneumonia* *K. oxytoca*	62 14 3
Lactococcus spp.	69
Listeria monocytogenes	2
Mold	1
No bacterial growth	84
No bacterial pathogens detected	371
Overgrown with contaminants (including *Proteus* spp.)	30
Pantoea spp.	21
Pasteurella multocida	8
Prototheca	16
Pseudomonas spp.	67
Raoultella spp.	3
Serratia marcescens	46
Serratia spp.	3
Staphylococcus aureus	305
Streptococcus spp. including: *S. uberis* *S. dysgalactiae* *S. canis* *S. suis*	246 135 75 9 1
Suspicious of *Mycoplasma*	1
Trueperella pyogenes	19
Yeast	23
TOTAL isolates	2480

This would be a good time to review a septic sample collection technique. This will ensure useful results are obtained from the diagnostic laboratory.

Reference:

NATIONAL MASTITIS COUNCIL (1999) Laboratory Handbook on Bovine Mastitis, Madison, WI, National Mastitis Council

Rabies update

Maureen Anderson, Animal Health and Welfare, OMAFRA, Guelph, ON

As of April 1, 2014 the Canadian Food Inspection Agency (CFIA) no longer responds to potential rabies exposure incidents in Canada, although rabies remains a federally Reportable Disease. Over the past 14 months, OMAFRA has been managing cases of potential domestic animal rabies exposure with the assistance of private veterinarians throughout Ontario. As rabies is a public health issue affecting both humans and animals, veterinarians are well-positioned to assess risk and provide guidance to animal owners when a potential rabies exposure occurs. **Private veterinarians have been integral to rabies response since the transition from the CFIA program.** Veterinarians should continue to call OMAFRA's Agricultural Information Contact Centre at 1-877-424-1300 for assistance with cases of potential domestic animal exposure to rabies.

The Ministry of Health and Long Term Care (MOHLTC) has contracted with the Ontario Association of Veterinary Technicians (OAVT) to provide sample collection and submission services related to cases of potential *human* exposure to rabies for Public Health Units in Ontario, starting with selected health units in January 2015. Risk assessments for these cases continue to be handled through the Public Health Units, and if testing is required contracted RVTs are dispatched individually to collect and submit samples (the RVTs do not perform the risk assessments themselves). *The OAVT Rabies Response Program (RRP) is currently only for use by Public Health Units for cases of potential human exposure.* RVTs interested in joining the OAVT RRP are invited to contact Kristina Cooper at 1-844-872-2437, or kristina@oavt.org.

Since March 2015 there has been a significant cluster of rabid raccoons identified along the Northern edge of Franklin County (New York), very close to the border with both Ontario and Quebec and across the river from Cornwall, ON. The most recent case in June 2015 was found in Quebec, only a few hundred meters from the Ontario border. Distribution of wildlife rabies vaccine baits has been completed on the US side, and is scheduled to be completed soon in the bordering areas of Ontario and Quebec (south of the St. Lawrence) as well.

Veterinarians need to remain vigilant for cases of domestic animal exposure to potentially rabid animals. The last case of raccoon rabies in Ontario was in 2005, and Southern Ontario is currently considered free of terrestrial rabies, with the last case of fox rabies having been detected in 2012. However, there continues to be a risk of incursion of fox rabies from Northern regions of the province and of raccoon rabies from New York state. Contact with rabid bats also remains a risk in all regions.

The Ontario Animal Health Network (OAHN) has also produced two informative podcast: one on what Ontario veterinarians need to know about rabies, and one about the OAVT RRP. They are freely available online, along with several other OAHN podcasts, at: *http://barhamm.podbean.com/*

Helping producers find local options for culled cows

Ann Godkin, Veterinary Science and Policy Unit, OMAFRA, Elora, ON

Recent discussions suggest producers may not always be aware of local slaughter options for culled dairy cows. A full list of provincially licensed abattoirs can be found on the OMAFRA website:

http://www.omafra.gov.on.ca/english/food/inspection/meatinsp/licenced_operators_list.htm

The list provides the abattoir name, address, phone number and classes or categories of animals they deal with. Slaughter days are not provided as they often vary depending on demand.

Some phone calls to abattoirs in your client area may help you to provide some additional options to your clients when they need to remove a cow from their herd but where the cow is not suitable for prolonged transport.

Resources:

Euthanasia Tips

For information on euthanasia techniques (including captive bolt and gunshot) and good videos and graphics on maintaining and cleaning the captive bolt, see Jan Shearer's Humane Euthanasia information on the Iowa State Veterinary Medicine website.

http://vetmed.iastate.edu/humaneeuthanasia/en/gunshot-or-captive-bolt

Dr. Shearer's excellent video on cleaning the captive bolt is on: *https://vimeo.com/97652185*

What is a PID?

A Premises Identification Number is a unique identifying number assigned to a parcel of land that is associated with agri-food activities. A PID is the cornerstone of traceability and surveillance initiatives. For veterinarians and livestock producers seeking to identify patterns of disease within and between farms, entering the PID on an Animal Health Laboratory (AHL) submission form accurately identifies the farm (owner and location) the samples came from.

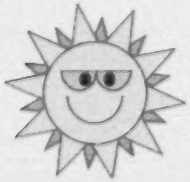
In Ontario, premises are identified and registered in the Provincial Premises Registry. You can help producers obtain or become aware of their PID so that it can be used on AHL submissions. There is more information about PID's on the OMAFRA website at: *http://www.omafra.gov.on.ca/english/food/foodsafety/traceability/start.htm*

How to Get a Premises Identification Number

Getting your Premises Identification Number is easy and free.

Contact the Provincial Premises Registry:
Online: *www.ontarioppr.com*

By phone: 1-855-697-7743 (MY PPR ID)



Enjoy a Happy and Safe Summer!

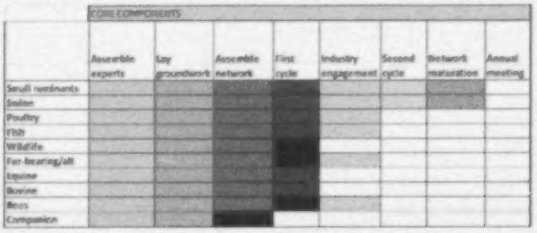
Ontario Animal Health Network

"Your comprehensive source for animal health information."

OAHN Update

The Ontario Animal Health Network is progressing well. We have made significant progress with a number of expert networks, which you can view below:

In addition to the Network progress, we have also set up a temporary webpage: http://oahn.ca, while our official page is created. We expect the design of the page to be complete by mid-June. We are also excited to include provincial slaughter condemnation data in the major agricultural sectors, as an additional information source. We are recording some great podcasts currently, so stay tuned at www.oahn.podbean.com, or subscribe via iTunes to never miss an episode. You may also wish to follow our Facebook and Twitter feeds for the most up to date information about disease outbreaks and network releases. If you have a suggestion/idea, let us know! Network updates are below.



SHEEP/GOATS

Q1 of 2015 (Jan/Feb/March) has completed
Look out for the Q1 2015 vet and producer reports on SRVO listserv.
Check out our podcast with OSMA and Ontario Goat (see link below).
Top items of discussion: emaciation and associated disease due to harsh winter.

FISH

Dr. Melanie Barham spoke about OAHN at the recent Northern Ontario Aquaculture Association meeting in Parry Sound.
Q2 2015 fish meeting will be taking place mid-June.

BOVINE

The bovine network is up and running!
Q1 2015 veterinary report will be released soon to the OABP listserv.
We had 71 responses to the survey after emailing the OABP listserv.
AHL contributed data, and provincial slaughter data was also included in discussions.

BEES

The first OAHN bee meeting will be taking place in late June 2015. Date and time TBA.
We will be releasing a bee podcast shortly with information of interest to the general public, veterinarians and bee keepers.

WILDLIFE

CCWHC is preparing a report for distribution to all the groups outlining the details of their surveillance systems in Ontario. Stay tuned for the reports in coming months.

SWINE

Q1 of 2015 (Jan/Feb/March) has completed.
Look out for the Q1 2015 vet and producer reports on the OASV listserv.
Gallant Custom Laboratories contributed data alongside AHL data.
Top items of discussion: collibaccillosis in suckling piglets, ascarid issues causing liver condemnation at provincial slaughter plants.

EQUINE

Q1 2015 veterinary report was released to OAEP listserv.
IDEXX laboratories will be contributing data alongside AHL in the next quarter.
Ontario Racing Commission death registry data will be included in the next quarter.
The first survey had 69 responses after emailing the OAEP listerv.
Discussions about anthelmintic resistance led to an AHL newsletter article about testing, and an owner report from OMAFRA (to be released soon).
OAHN will be participating in the first equine disease simulation being hosted with OMAFRA mid June.

COMPANION

The companion animal network will be launched imminently. A call for nominations will be put out within the next month.
A great group of veterinarians across Ontario met as a focus group to help determine the shape of OAHN's companion animal network.
Follow us on Facebook for up to date notifications about diseases in your area, and helpful news articles for you and your clinic.

POULTRY

Q2 2015 (Feb/March/April) meeting is taking place May 21st- expect the veterinary report shortly thereafter.
Avian influenza infographic for backyard flock owners can be found on our Facebook page, and was well received by industry.
OAHN was featured on multiple radio broadcasts for farm radio reports, directing producers to resources.
Veterinarian to veterinarian mentoring was set up through CVO and participation of Ontario Poultry vets.
OAHN held an emergency call early in the avian influenza outbreak to discuss possible gaps and issues of concern. Small flock grower initiatives were undertaken together with OMAFRA and industry, including release of avian influenza information to small flock growers, information for vets called upon to treat small flocks, and teleconferences for small flock growers with experienced poultry veterinarians.

ALTERNATIVE SPECIES

Dr. Hugh Hildebrandt, leading expert in mink medicine, lead a well-attended mink veterinary workshop April 11th, 2015. The workshop was attended by 15 veterinarians from across the province and some via teleconference from across Canada. Dr. Marina Brash, Emily Martin, Pat Turner were also instructors for the post mortem workshop, and Brian Tapscott from OMAFRA lectured about the background and future of this growing sector. Industry partners generously shared the cost of this workshop.
A call for mink veterinarians to discuss cases with experts in the field will be taking place each quarter. If you are interested in being part of this call, please contact Dr. Melanie Barham at barhamm@uoguelph.ca

Continuing Education/Coming Events

2015

June 24 – 25	Precision Dairy 2015, Rochester MN
July 12 – 16	2015 Joint Annual Meeting (JAM) of ADSA ASAS. Orlando, Florida. *http://www.jtmtg.org/JAM/2015/*
July 28 – 29	NATIONAL MASTITIS COUNCIL REGIONAL MEETING. Holiday Inn Syracuse/ Liverpool *http://nmconline.org/regionalmeet/2015/*
August 17 – 19	AABP - AETA Embryo Transfer Seminar. Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA. *http://aabp.org/meeting/seminar/*
August 17– 18	2015 Applied Reproductive Strategies in Beef Cattle Symposium UC Davis Conference Center, University of California, Davis. *http://www.appliedreprostrategies.com/*
September 17 – 19	48th Annual Conference of the American Association of Bovine Practitioners and American Association of Small Ruminant Practitioners, New Orleans, Louisiana. *http://www.aabp.org/meeting/default.asp*
September 19 – 22	2015 Allen D. Leman Swine Conference. St. Paul River Centre, St. Paul, Minnesota.
September 23	Shakespeare Swine Seminar. Optimist Hall, Shakespeare, Ontario.
October 17 – 18	AASRP Small Ruminant CE Program, American Dairy Goat Association Annual Meeting and Convention Boise, Idaho *http://www.adgaconvention.com*
October 28	Small Ruminant Veterinarians of Ontario Fall Continuing Education Meeting, Nottawasaga Inn, Alliston, ON *www.srvo.ca*
November 18 – 19	Ontario Association of Bovine Practitioners Fall CE Meeting. Holiday Inn, Guelph. *www.oabp.ca*
November 12 – 13	Dairy Cattle Reproduction Council Annual Meeting. Adam's Mark Hotel Buffalo, New York. *http://www.dcrcouncil.org/meetings.aspx*

2016

January 14 – 16	Western Canadian Association of Bovine Practitioner's Conference. Sheraton Cavalier Hotel, Calgary, Alberta. *www.wcabp.com*
January 23 – 26	42nd International Embryo Transfer Society Annual Conference. Galt House, Louisville, Ky. "Embryo Resilience in the Face of Biotechnology." *http://www.iets.org/2016/*
January 31 – February 2	NMC 55th Annual Meeting. *Glendale, Arizona.* *http://nmconline.org/meetings.html*
June 21— 23	Conference on Precision Dairy Farming, Leeuwarden, Netherlands *www.precisiondairyfarming.com/2016/*

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Tel.:(519) 846-0965 Fax: (519) 846-8178 E-mail: carolynne.gilchrist@ontario.ca

Comments: .....

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Deadline for next issue: September 4, 2015

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Ministry of Agriculture Food and Rural Affairs

Veterinary Science and Policy Unit
6484 Wellington Road 7
Unit 10
Elora, ON
N0B 1S0